

LIST OF CURRENT CLAIMS

1. (Currently Amended) A method for digitizing at least a subarea of the papillary structure of the skin, the subarea defining an intensity profile (~~IP~~) with a continuous intensity domain (~~KI~~), comprising the steps of:

- transforming the intensity profile (~~IP~~) into at least one analog electrical signal, and

- transforming said analog electrical signal into at least one digital signal (~~DS, DS1, DS2~~) with an intensity domain (~~A1, A2~~) ~~consisting of~~ comprising discrete intensity values (~~W, W1, W2~~) and a space domain comprising ~~consisting of~~ discrete positions,

~~characterized by the steps of~~

- repeatedly performing the transforming steps for the same subarea to form a plurality of different digital signals (~~DS, DS1, DS2~~), and

- combining the plurality of digital signals (~~DS, DS1, DS2~~) into a common digital papillary structure signal (~~PS~~) with an intensity domain (~~DI~~) formed from discrete intensity values (~~W~~) and a space domain formed from discrete positions in such a way that the intensity domain (~~DI~~) of the papillary structure signal (~~PS~~) has more intensity values (~~W~~) than the intensity domains of each single one of the plurality of digital signals (~~DS, DS1, DS2~~).

2. (Currently Amended) The method according to claim 1, wherein ~~characterized in that~~ the repeated performing of the transforming steps is done for different portions (~~A1, A2~~) of the continuous intensity domain (~~KI~~) in each case, so that after the combining step the intensity domain (~~DI~~) of the digital papillary structure signal (~~PS~~) covers a larger portion of the continuous intensity domain (~~KI~~) than the intensity domains of each single one of the plurality of digital signals (~~DS, DS1, DS2~~).

3. (Currently Amended) The method according to claim 2, wherein ~~characterized in that~~ upon the repeated performing of the transforming steps, the portions (A1, A2) of the continuous intensity domain (KI) are determined upon transforming the intensity profile (IP) into the analog electrical signal.

4. (Currently Amended) The method according to claim 3, wherein ~~characterized in that~~ the determination of the second and the further portions is carried out ~~done by using means of~~ data of the previous portion or portions.

5. (Currently Amended) The method according to claim 3, wherein ~~or 4,~~ ~~characterized in that~~ the number of intensity values (W) is determined by the choice or number of portions.

6. (Currently Amended) The method according to claim 3, wherein ~~any of claims 3 to 5, characterized in that~~ the transforming of the intensity profile (IP) into an analog electrical signal is done by a capacitive signal converter, and the portion (A1, A2) of the continuous intensity domain (KI) is determined by quantities of charge applied to the capacitors of the capacitive signal converter.

7. (Currently Amended) The method according to claim 2, wherein ~~characterized in that~~ upon the repeated performing of the transforming steps, the portions (A1, A2) of the continuous intensity domain (KI) are determined upon transforming the analog electrical signal into a digital signal (DS, DS1, DS2).

8. (Currently Amended) The method according to claim 7, wherein ~~characterized in that~~ the determination of the second and the further portions is carried out ~~done by using means of~~ data of the previous portion or portions.

9. (Currently Amended) The method according to claim 7, wherein ~~or 8,~~
~~characterized in that~~ the number of intensity values (~~W~~) is determined by the choice
or number of portions.

10. (Currently Amended) The method according to claim 2, wherein ~~any of~~
~~claims 2 to 5, characterized in that~~ the portions (~~A1, A2~~) of the continuous intensity
domain (~~KI~~) together cover the total continuous intensity domain (~~KI~~).

11. (Currently Amended) The method according to claim 2, wherein ~~any of~~
~~claims 2 to 10, characterized in that~~ the portions (~~A1, A2~~) of the continuous intensity
domain (~~KI~~) are adjacent and do not overlap.

12. (Currently Amended) The method according to claim 2, wherein ~~any of~~
~~claims 2 to 10, characterized in that~~ the portions (~~A1, A2~~) of the continuous intensity
domain (~~KI~~) overlap.

13. (Currently Amended) The method according to claim 1, wherein ~~any of~~
~~claims 1 to 12, characterized in that~~ the repeated performing of the transforming
steps is carried out ~~done~~ with different numbers of discrete intensity values (~~W1,~~
~~W2~~) of the intensity domains of the digital signals (~~DS, DS1, DS2~~) in each case.

14. (Currently Amended) The method according to claim 1, wherein ~~any of~~
~~claims 1 to 13, characterized in that~~ the combining step comprises the following
substeps:

- estimating a discrete intensity value (~~W~~) for each discrete position of
the digital papillary structure signal (~~PS~~) from the respective discrete intensity values
(~~W1, W2~~) of the accordingly corresponding discrete positions of the digital signals
(~~DS, DS1, DS2~~), and

- entering the estimated intensity value (~~W~~) at the corresponding discrete position of the digital papillary structure signal (~~PS~~).

15. (Currently Amended) The method according to claim 2, wherein any of claims 2 to 12 with claim 14, characterized in that the combining step comprises before the estimating and entering substeps the following substep:

- normalizing the intensity domains of the plurality of digital signals (~~DS, DS1, DS2~~) to the portion (~~A1, A2~~) of the continuous intensity domain (~~KI~~) detected by the respective digital signal (~~DS, DS1, DS2~~).

16. (Currently Amended) The method according to claim 15, wherein characterized in that upon the estimating step, only those discrete intensity values (~~W1, W2~~) of the accordingly corresponding positions of the digital signals (~~DS, DS1, DS2~~) are taken into account that do not represent a maximum or minimum intensity value (~~W1, W2~~) of the respective digital signal (~~DS, DS1, DS2~~).

17. (Currently Amended) The method according to claim 14, wherein any of claims 14 to 16, characterized in that upon the estimating step, the arithmetic mean of the discrete intensity values (~~W1, W2~~) of the accordingly corresponding positions of the digital signals (~~DS, DS1, DS2~~) is formed as the discrete intensity value (~~W~~) of a discrete position of the digital papillary structure signal (~~PS~~).

18. (Currently Amended) The method according to claim 1, wherein any of claims 1 to 13, characterized in that upon the repeated performing of the transforming steps, the continuous intensity domain (~~KI~~) is mapped to intensity domains of the plurality of digital signals (~~DS, DS1, DS2~~) with only two discrete intensity values (~~W1, W2~~) in each case, and wherein whereby for each of the plurality of digital signals (~~DS, DS1, DS2~~) a different threshold value is determined for partitioning the continuous intensity domain (~~KI~~) into two subdomains which are

each mapped to one of the two discrete intensity values (~~W1, W2~~) of each of the plurality of digital signals (~~DS, DS1, DS2~~).

19. (Currently Amended) The method according to claim 18, wherein ~~characterized in that~~ upon the combining step, the plurality of digital signals (~~DS, DS1, DS2~~) is added up.

20. (Currently Amended) The method according to claim 1, wherein ~~any of claims 1 to 17, characterized in that~~ upon the repeated performing of the transforming steps, digital color signals (~~DS, DS1, DS2~~) are produced, and a digital papillary structure color signal (~~PS~~) is produced therefrom upon the combining step.

21. (Currently Amended) An apparatus for digitizing at least a subarea of the papillary structure of the skin, the subarea defining an intensity profile (~~IP~~) with a continuous intensity domain (~~KI~~), comprising a transformation device (~~TE~~) for transforming the intensity profile (~~IP~~) into at least one analog electrical signal, and an analog/digital converter (~~AD~~) for transforming said analog electrical signal into at least one digital signal (~~DS, DS1, DS2~~) with an intensity domain comprising ~~consisting of~~ discrete intensity values (~~W1, W2~~) and a space domain comprising ~~consisting of~~ discrete positions, ~~characterized in that the apparatus further comprises:~~

[[-]] a control device (~~SE~~) which causes the transformation device (~~TE~~) and the analog/digital converter (~~AD~~) to produce a plurality of different digital signals (~~DS, DS1, DS2~~) for the same subarea, and

[[-]] a combination device (~~KE~~) which combines the plurality of digital signals (~~DS, DS1, DS2~~) into a common digital papillary structure signal (~~PS~~) with an intensity domain comprising (~~DI~~) ~~consisting of~~ discrete intensity values (~~W~~) and a space domain comprising ~~consisting of~~ discrete positions in such a way that the intensity domain (~~DI~~) of the digital papillary structure signal (~~PS~~) has more discrete

intensity values (~~W~~) than the intensity domains of each single one of the plurality of digital signals (~~DS, DS1, DS2~~).

22. (Currently Amended) The apparatus according to claim 17, wherein
~~characterized in that~~

- the control device is arranged to determine (~~SE~~) ~~determines~~ in each case different portions (~~A1, A2~~) of the continuous intensity domain (~~KI~~) of the intensity profile (~~IP~~) to be mapped to the intensity domain of the respective digital signal (~~DS, DS1, DS2~~), and

- the combination device (~~KE~~) is arranged to combine ~~combines~~ the plurality of digital signals (~~DS, DS1, DS2~~) in such a way that the intensity domain (~~DI~~) of the digital papillary structure signal (~~PS~~) covers a larger portion (~~A1, A2~~) of the continuous intensity domain (~~KI~~) than the intensity domains of each single one of the plurality of digital signals (~~DS, DS1, DS2~~).

23. (Currently Amended) The apparatus according to claim 22, including means for mapping ~~characterized in that~~ a portion (~~A1, A2~~) to be mapped of the continuous intensity domain (~~KI~~) of the intensity profile (~~IP~~) as determined by the control device (~~SE~~) ~~is mapped~~ to the analog electrical signal upon transformation of the intensity profile (~~IP~~) by the transformation device (~~TE~~).

24. (Currently Amended) The apparatus according to claim 22, wherein ~~or~~ 23, ~~characterized in that~~ the transformation device (~~TE~~) is a capacitive signal converter.

25. (Currently Amended) The apparatus according to claim 22, including means for mapping ~~characterized in that~~ a portion (~~A1, A2~~) to be mapped of the continuous intensity domain (~~KI~~) of the intensity profile (~~IP~~) as determined by the

control device (~~SE~~) is mapped to a digital signal (~~DS, DS1, DS2~~) upon transformation of the analog electrical signal by the analog/digital converter (~~AD~~).

26. (Currently Amended) The apparatus according to claim 22, wherein any of claims 22 to 25, characterized in that the control device is arranged to adjust (~~SE~~) adjusts the portions (~~A1, A2~~) to be mapped of the continuous intensity domain (~~KI~~) of the intensity profile (~~IP~~) in such a way that they altogether cover the total continuous intensity domain (~~KI~~).

27. (Currently Amended) The apparatus according to claim 21, wherein any of claims 21 to 26, characterized in that the control device is arranged to determine (~~SE~~) determines in each case different numbers of discrete intensity values (~~W1, W2~~) for the intensity domains of the digital signals (~~DS, DS1, DS2~~).

28. (Currently Amended) The apparatus according to claim 21, wherein any of claims 21 to 26, characterized in that the combination device is arranged to estimate (~~KE~~) estimates a discrete intensity value (~~W~~) for each discrete position of the digital papillary structure signal (~~PS~~) from the respective discrete intensity values (~~W1, W2~~) of the accordingly corresponding discrete positions of the digital signals (~~DS, DS1, DS2~~).

29. (Currently Amended) The apparatus according to claim 22, wherein any of claims 22 to 26 with claim 28, characterized in that the combination device (~~KE~~), before estimation of the discrete intensity values (~~W~~) of the digital papillary structure signal (~~PS~~), is arranged to normalize normalizes the intensity domains of the plurality of digital signals (~~DS, DS1, DS2~~) to the portion (~~A1, A2~~) of the continuous intensity domain (~~KI~~) detected by the respective digital signal (~~DS, DS1, DS2~~).

30. (Currently Amended) The apparatus according to claim 29, wherein ~~characterized in that~~ the combination device (~~KE~~), upon estimation of the discrete intensity values (~~W~~) of the digital papillary structure signal, is arranged to take (~~PS~~), takes into account only those intensity values (~~W1, W2~~) of the accordingly corresponding discrete positions of the digital signals (~~DS, DS1, DS2~~) that do not represent either the maximum or the minimum intensity value (~~W1, W2~~) of the particular intensity domain.

31. (Currently Amended) The apparatus according to claim 21, wherein: ~~any of claims 21 to 27, characterized in that~~

- the control device is arranged to determine (~~SE~~) ~~determines~~ for each of the plurality of digital signals (~~DS, DS1, DS2~~) intensity domains with only two discrete intensity values (~~W1, W2~~), and to determine ~~determines~~ for each digital signal (~~DS, DS1, DS2~~) a different threshold value for partitioning the continuous intensity domain (~~K1~~) into two subdomains, for mapping one of the subdomains to in each case one of the two discrete intensity values (~~W1, W2~~) of each of the plurality of digital signals (~~DS, DS1, DS2~~), and
- the combination device is arranged to add (~~KE~~) ~~adds up~~ the digital signals (~~DS, DS1, DS2~~).

32. (Currently Amended) The apparatus according to claim 21, wherein: ~~any of claims 21 to 30, characterized in that~~

- the transformation device (~~TE~~) and the analog/digital converter (~~AD~~) produce digital color signals (~~DS, DS1, DS2~~),
- the control device (~~SE~~) causes the transformation device (~~TE~~) and the analog/digital converter (~~AD~~) to produce a plurality of different digital color signals (~~DS, DS1, DS2~~) for the same subarea, and
- the combination device (~~KE~~) produces a digital papillary structure color signal (~~PS~~).